

SGRT Use with Triggered Imaging in DIBH Liver Metastases Treatment

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Implementation of AlignRT

2016

- First system purchased
- Used for a short period of time
- Primarily chest treatments

2018 - 2020

- Began using system more
- Chest, Breast, Abdomen
- Only on one machine

2021

- Installed and upgraded AlignRT across all three treatment machines
- Use daily on over 75% of patients
- Extensively utilized for setup of extremities
- Not routinely used on Pelvis and H&N

Patient History

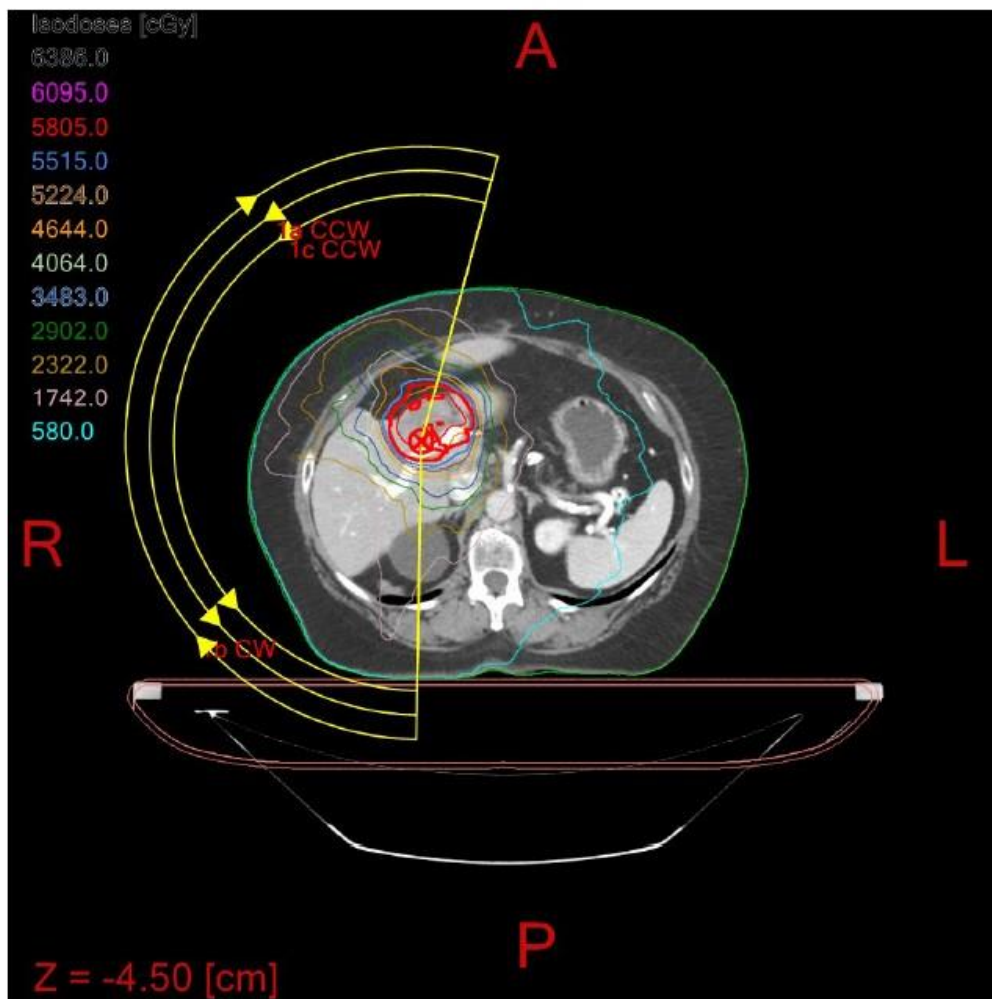
- ▶ Diagnosis: Adenocarcinoma of the Gallbladder
- ▶ CT Imaging 10/10/22 – recurrence of intrahepatic lesion s/p resection in November 2021
- ▶ Oligometastatic disease warranted aggressive local treatment in hopes of prolonged local control
- ▶ Treatment Rx: 387 cGy x 15 fx
 - ▶ Total Dose: 5805 cGy

CT Simulation

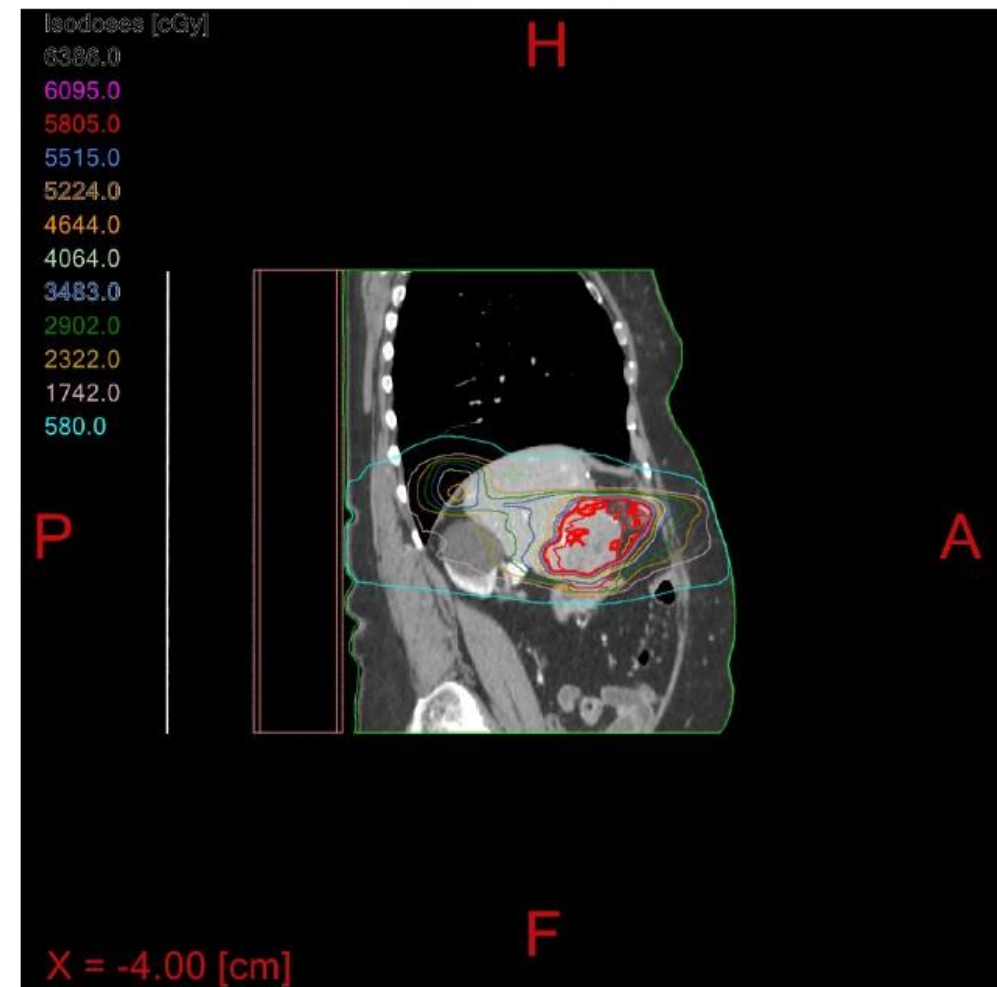
- ▶ 4D Scan with Average
- ▶ 2 mm slices
- ▶ IV Contrast
- ▶ Scanned with and without compression belt
- ▶ Scanned with compression belt in alternative position
- ▶ Scanned with Breath Hold
 - ▶ Treat with DIBH

Treatment Plan

1 Liver VMAT - Transverse - Isocenter Z Offset = 0cm

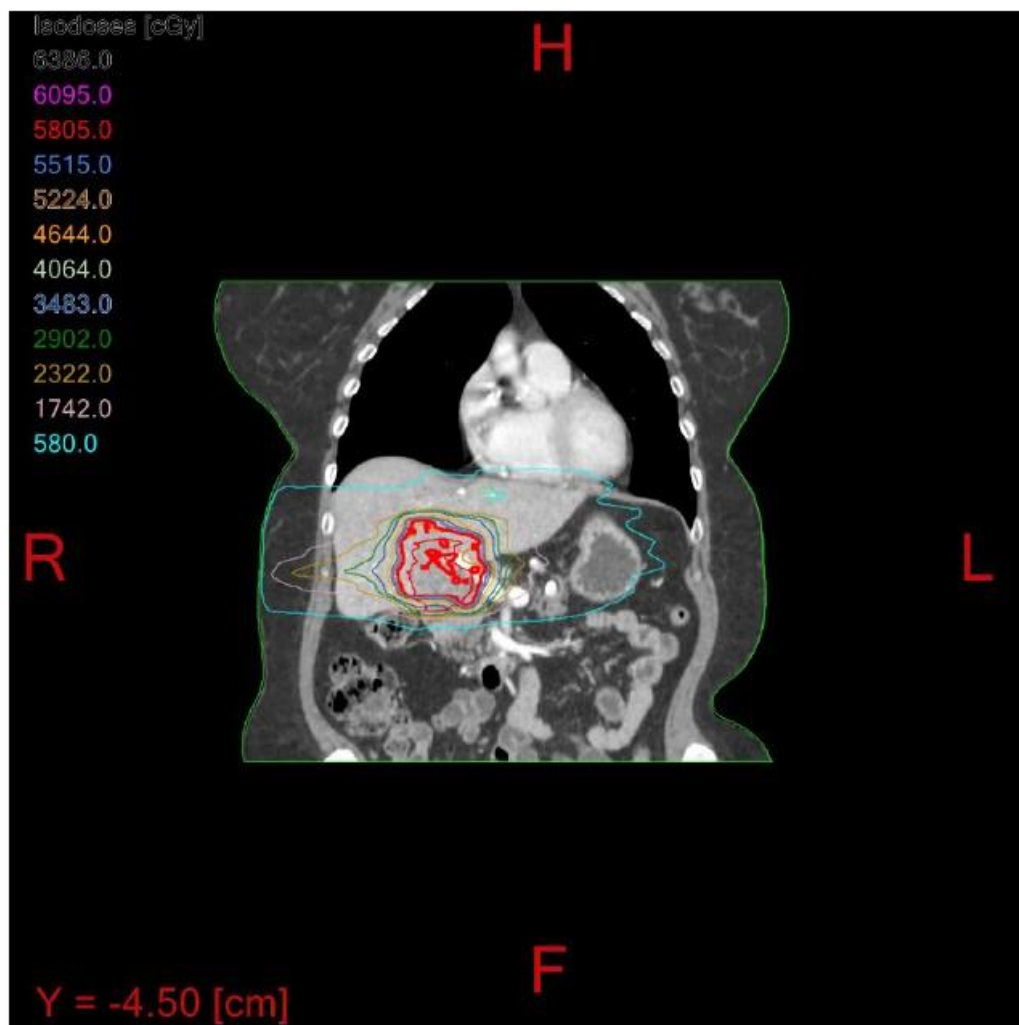


1 Liver VMAT - Sagittal - Isocenter X Offset = 0cm



Treatment Plan

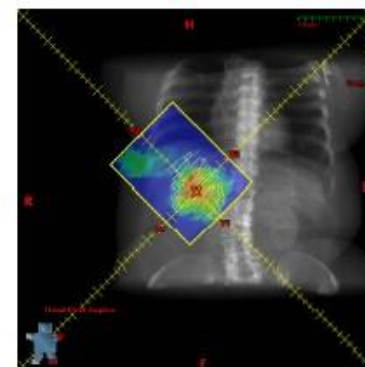
1 Liver VMAT - Coronal - Isocenter Y Offset = 0cm



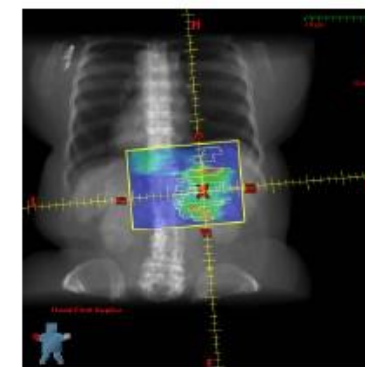
Reference Points
Iso-Liver

BEVs

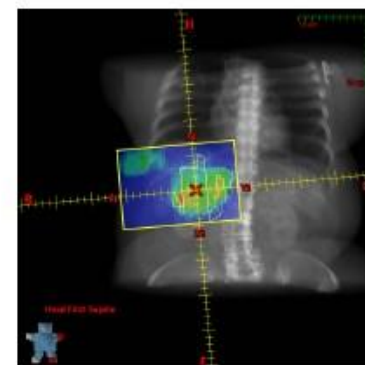
1a CCW



1b CW



1c CCW

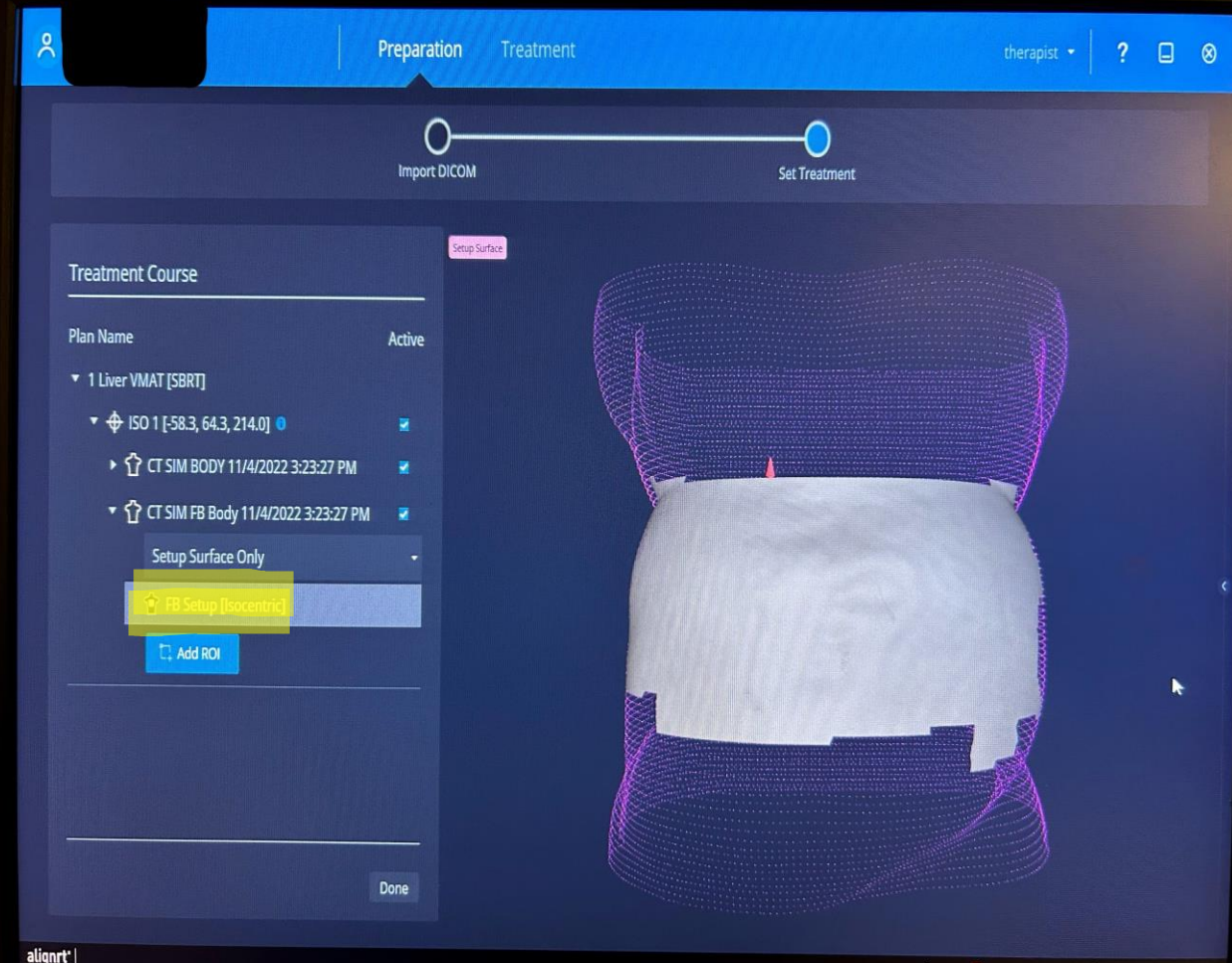
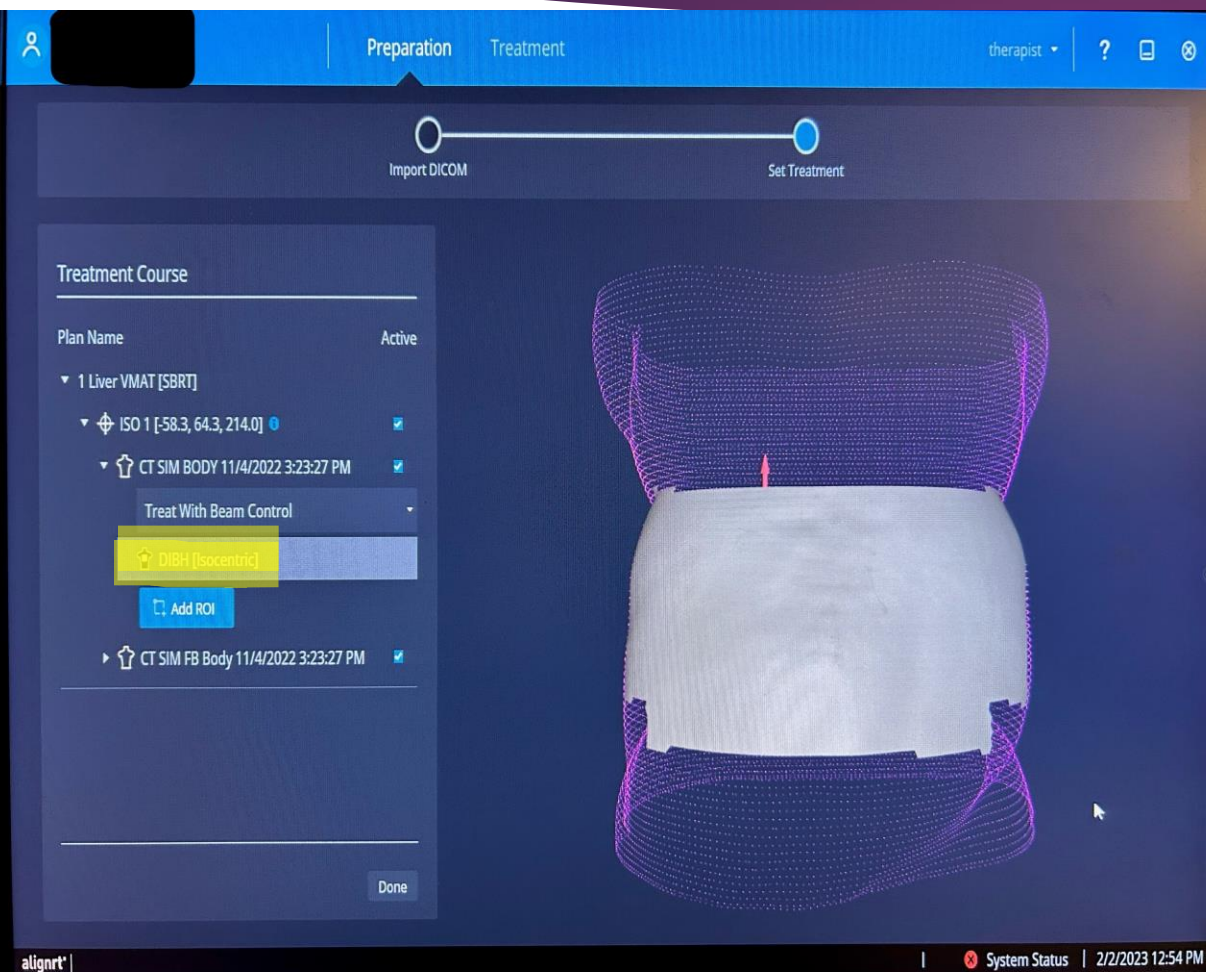


— Iso-Liver

Treatment Procedure

- ALIGN RT
- DIBH, CBCT
- TRIGGERED IMAGING

Align RT for Daily Positioning and Monitoring DIBH



CBCT Imaging
Shift
Reference Capture

Treatment

Record and Verify mode

Change Mode

ID 1

Last Name

First Name

DOB

Rad. Onc.

Brett, Christopher L.

Dose Details

1 Liver VMAT

Fraction: 7 of 15

KV CBCT

1a CCW

301 / 301

1b CW

308 / 308

1c CCW

331 / 331

ap mv

KV-KV Setup Pair

rt lat mv

Primary User

puttin

03:39 PM 30-Nov-2022

PATIENT ORIENTATION

Head First, Supine

Privacy Shade

Clearance Override

Imaging Systems

Vrt

Lng

Lat

MV Imaging [cm]

Mid

KV Imaging [cm]

50.0

0.0

0.0

Filter/Blades

At plan

kV Acquisition Parameters

kV

110

mAs

15.00

Anatomy

Pelvis

Size

Large

Interval ["]

30

Imaging Acquisition Settings

Image

Focus

Image

Field Size

Beam Tracking

Persistent parameters loaded

Loading Reference CT:

CT and structures created.

kV Imaging

2D-3D Match

To pause treatment, press Beam Off.

Preview

Prepare

Ready

Beam Hold

Record

Beam

Plan

Actual

Geometry

Plan

Actual

Beam's Eye View

Beam Type

DYNAMIC (RapidArc™)

Gantry Rtn

15.0

181.0

Energy Type

10x

Gantry Stop

181.0

Coil Rtn

275.0

275.0

Y1

10.8

10.8

Y2

6.0

6.0

X1

6.6

6.6

X2

4.7

4.7

Dose Rate

600

0

Timer

0.66

0.76

EDW

None

None

Couch Vrt

15.93

15.93

Lng

141.03

141.03

Lat

6.05

6.05

Rtn

358.7

358.7

Pitch

-1.9

-1.9

Roll

0.4

0.4

Comp Mount

No Accy

No Accy

Int Mount

No Accy

No Accy

Acc Mount

No Accy

No Accy

e-Aperture

No Accy

No Accy

Comp Mount

No Accy

No Accy

Bolus

None

Tot. Table

TB Imaging

Y1

X1

X2

Y2

Y= 16.8

X= 11.3

MLC

Arc Dynamic

Reorder

Deactivate

Add

Remove

Tools

Notes

Close Patient

Override

Acquire

Edit

GoTo

Apply

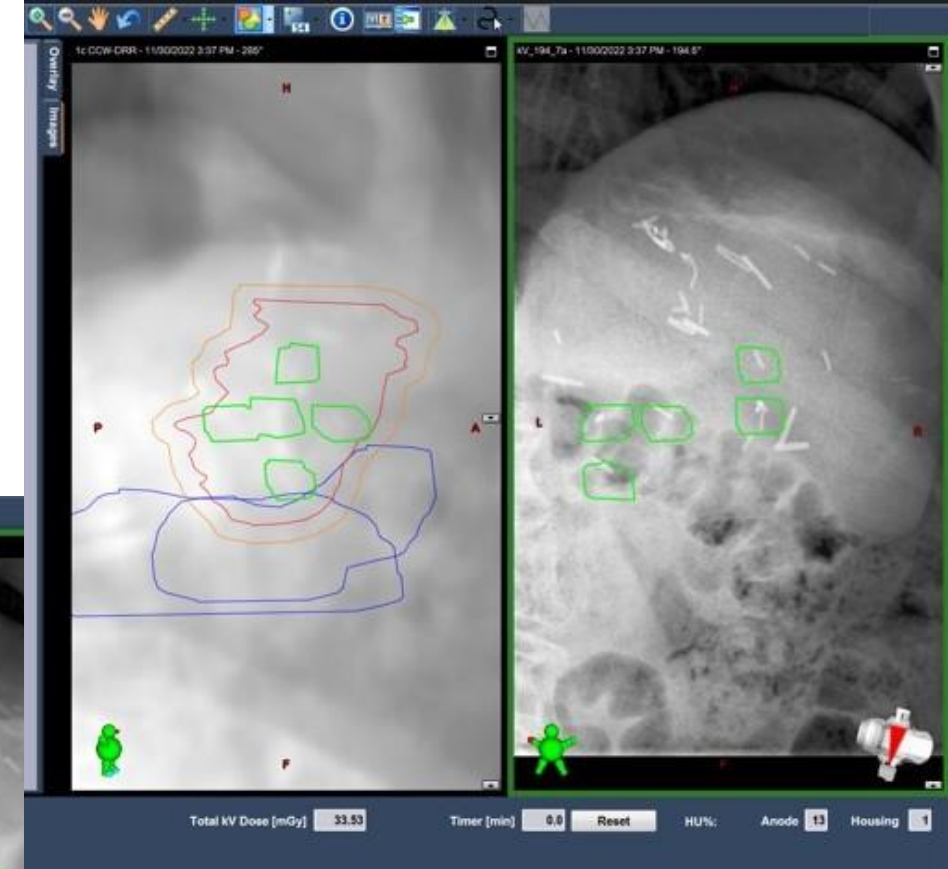
Cancel

Scale: Values (C) Units: centimeters, degrees, minutes, or MU per minute.

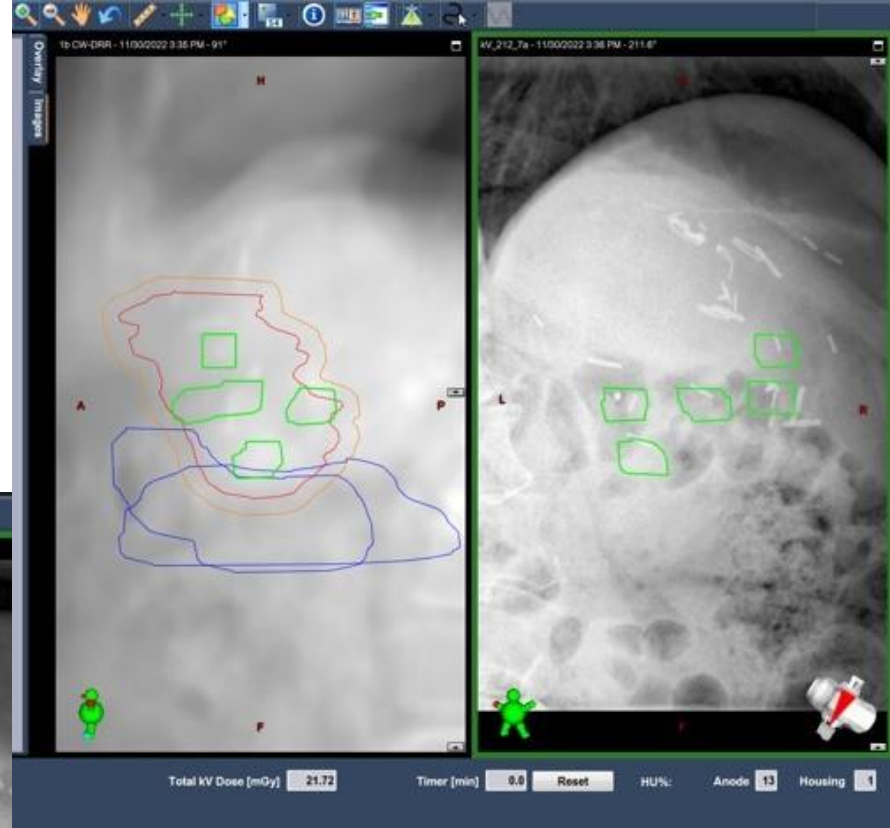
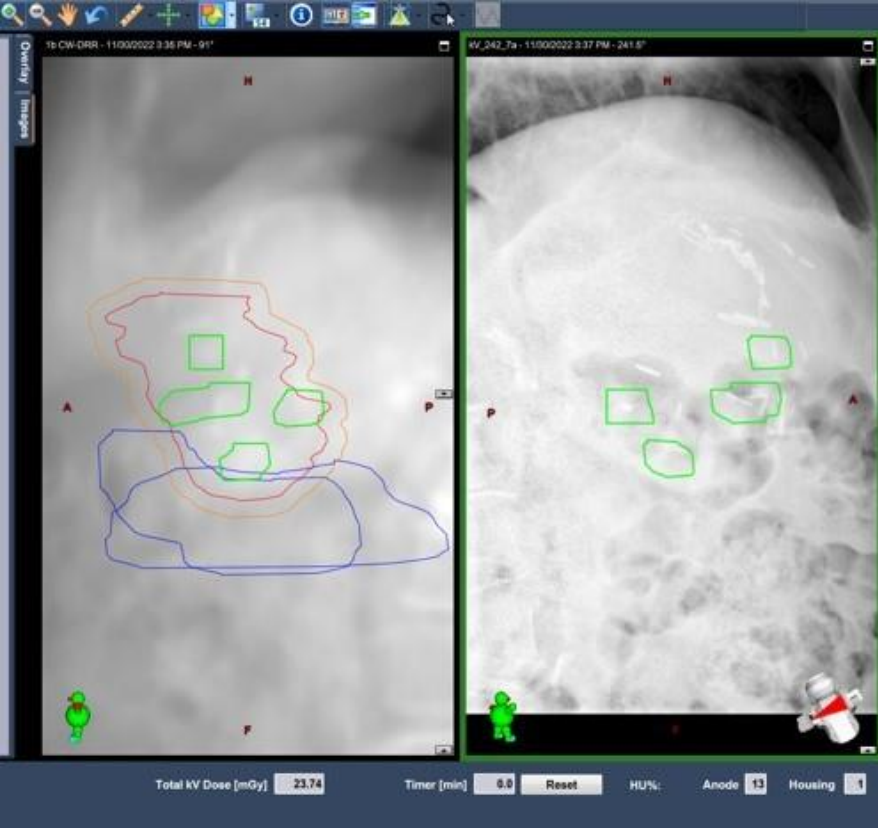
Treatment Console

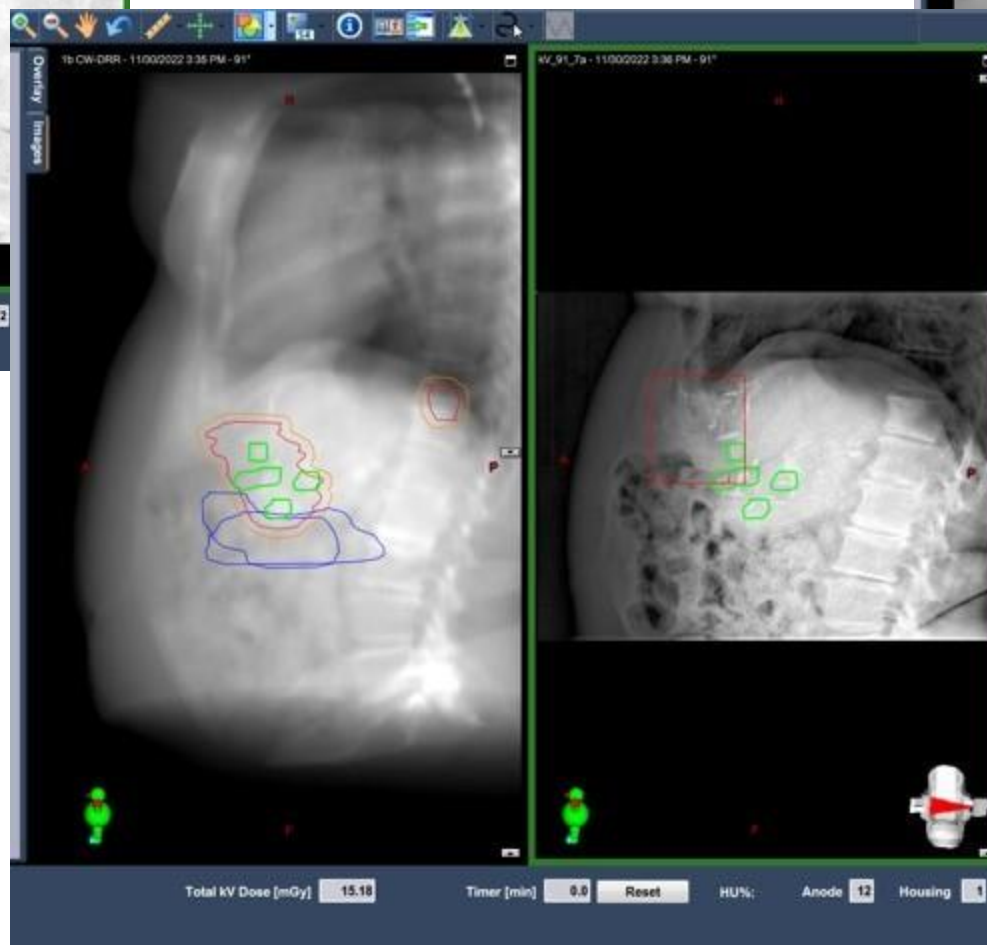


Triggered
Images every
30 degrees of
rotation









Results

- REPRODUCIBLE SETUP
- MONITORING WITH TRIGGERED IMAGING
- EFFICIENT TREATMENT TIME

FIRST MONITORING SESSION

Protocol:	SBRT	Start Time:	11/21/2022 3:20:22 PM
Plan Name:	1 Liver VMAT	End Time:	11/21/2022 3:34:19 PM
Isocentre:	-58.3, 64.3, 214.0	Total Duration:	00:13:57

SAVED SSDS

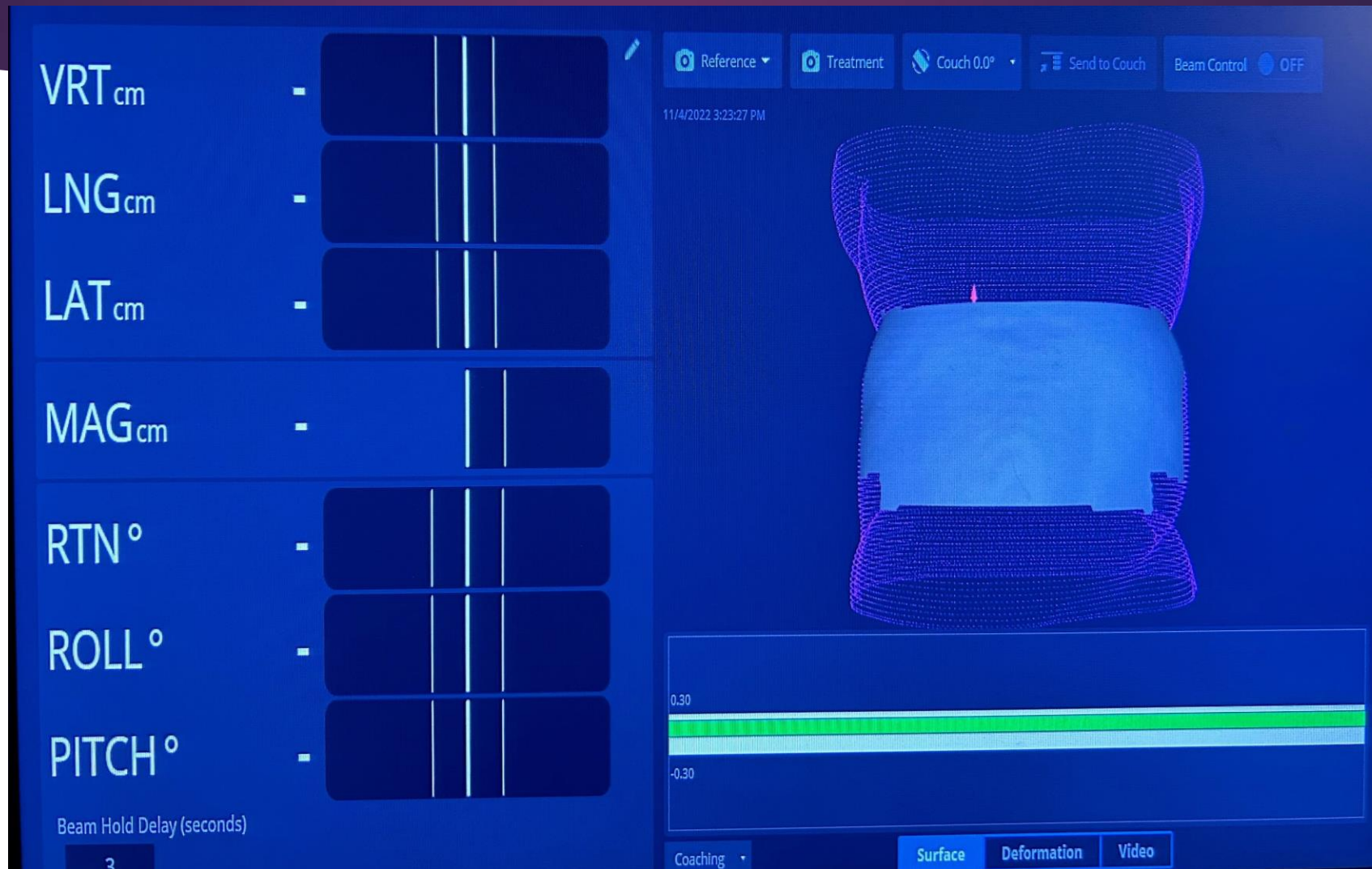
1 Liver VMAT - 11/21/2022 8:52 PM

Field ID	Gantry (°)	Couch (°)	Plan (cm)	Current (cm)
ap kv	0.0	0.0	89.6	89.4
rt lat kv	270.0	0.0	88.1	87.7
ap mv	0.0	0.0	89.6	89.4
rt lat mv	270.0	0.0	88.1	87.7
cbct	0.0	0.0	89.6	89.4
1a CCW	15.0	0.0	88.8	88.6
1b CW	181.0	0.0	83.4	N/A
1c CCW	15.0	0.0	88.8	88.6
ap mv	0.0	0.0	89.6	89.4
ap mv	0.0	0.0	89.6	89.4
rt lat mv	270.0	0.0	88.1	87.7
rt lat mv	270.0	0.0	88.1	87.7

Setup
Reproducible
within 0.4
centimeters

AlignRT monitoring effective despite presence of OBI extension necessary for triggered imaging.

ROI
Size and
Location



Treatment Times

- ▶ Longest: 25 minutes 8 seconds
- ▶ Shortest: 13 minutes 27 seconds
- ▶ Average: 16 minutes 57 seconds

Patient Follow-Up

Patient saw Rad Onc on 4/18/23. Images revealed response to treatment, and patient experienced zero side effects and even stopped taking her nausea medications.